VIIRS in National Weather Service, Alaska

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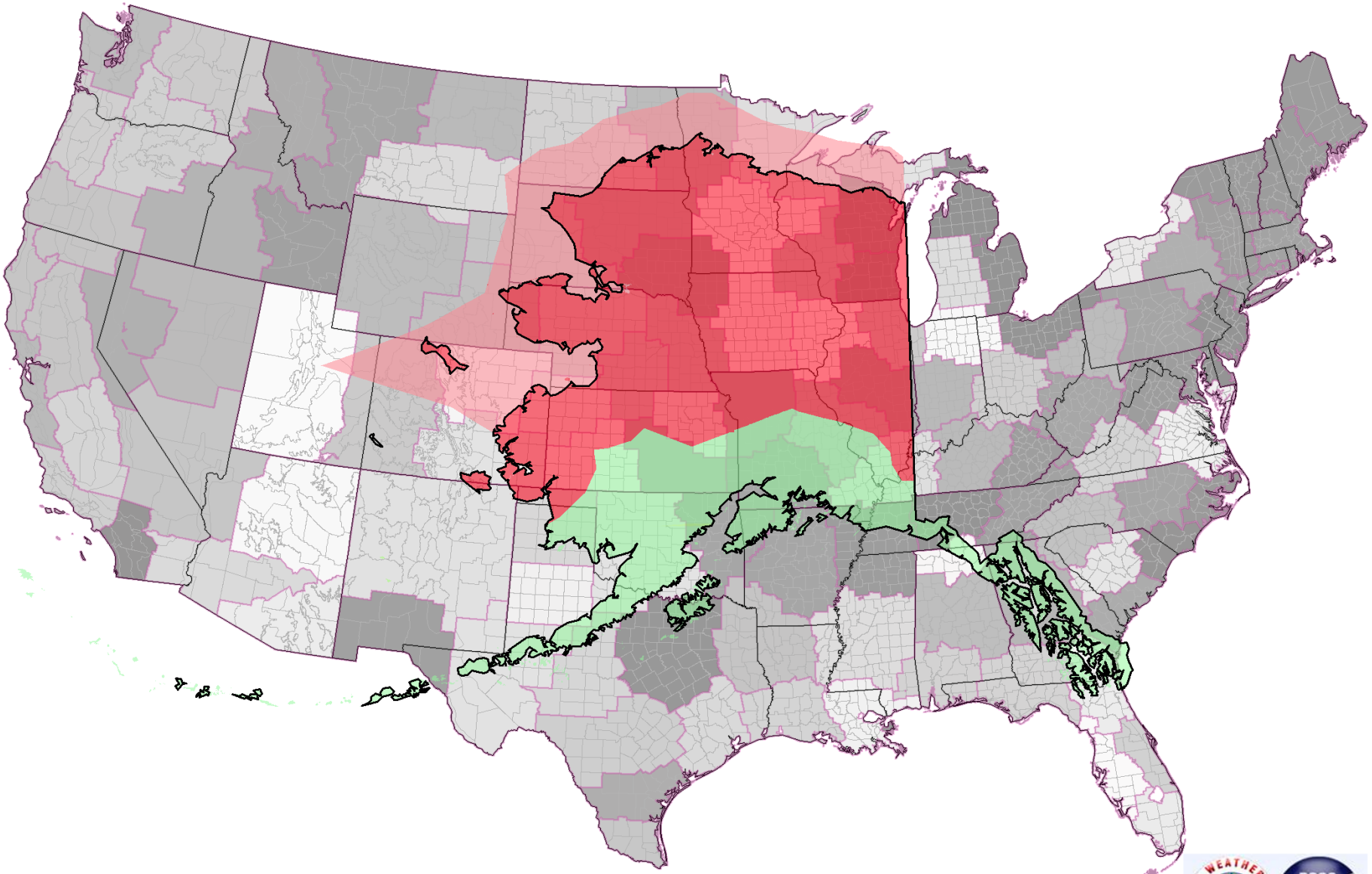
University of Alaska, GINA

Outline

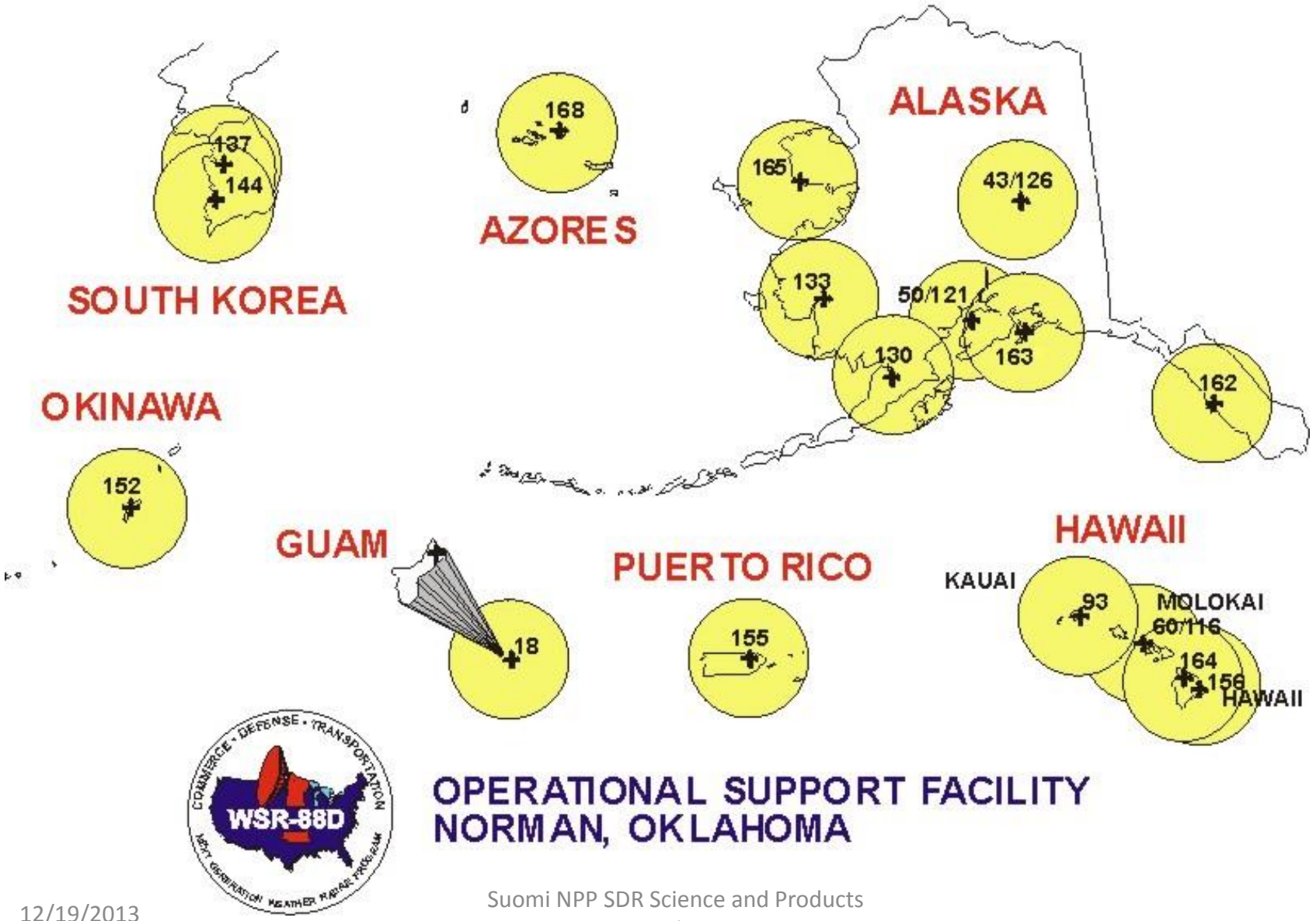
- Importance of satellite products to NWS Alaska
- Producing and delivering VIIRS products to the NWS in Alaska
- Examples of VIIRS in use by the NWS in Alaska

Importance of Satellite Products to National Weather Service, Alaska

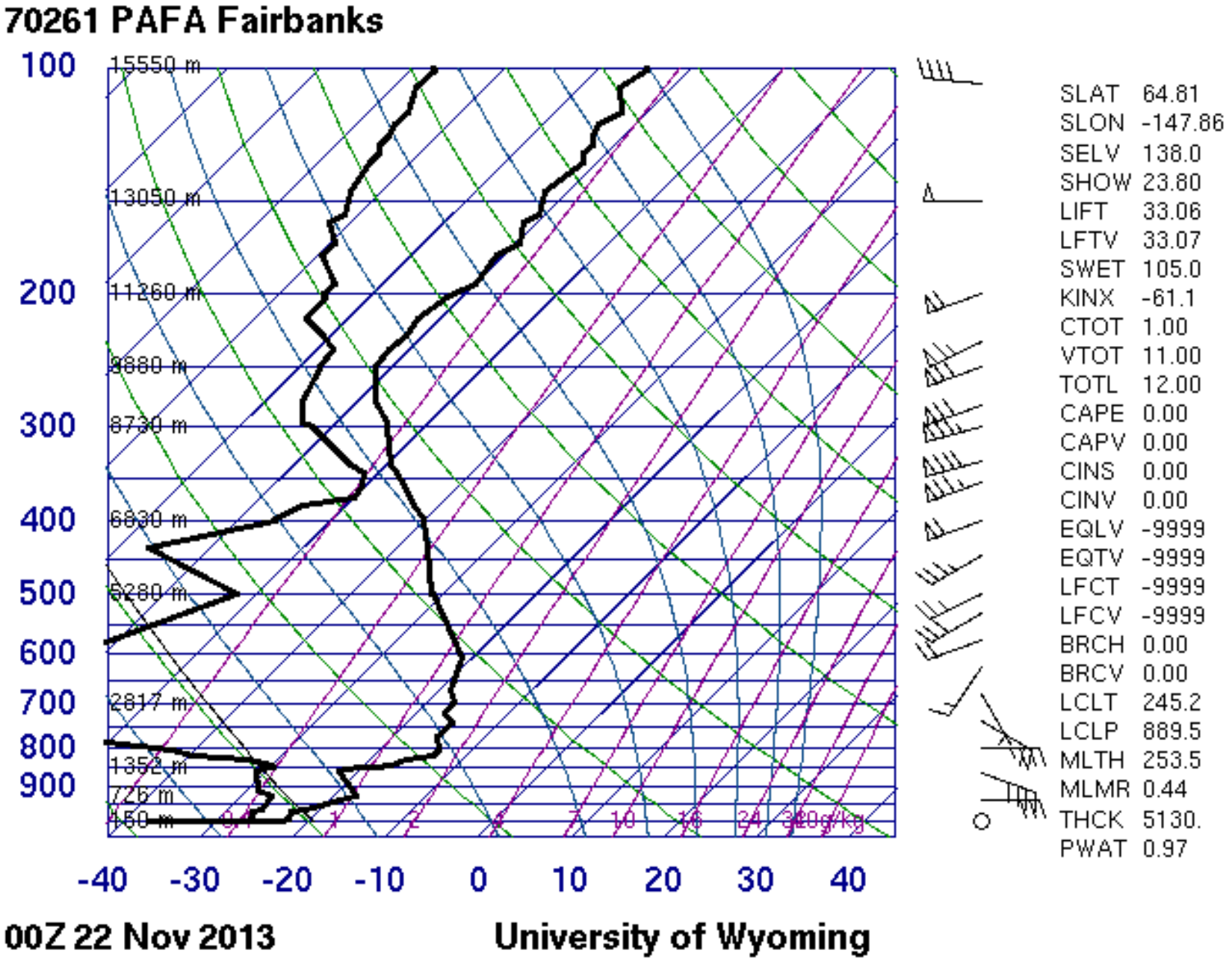
- Forecasters must analyze and forecast weather over huge heterogeneous areas
- Many observation systems, such as radar, METARs, river gages, suffer from low spatial density in Alaska
- Many surface-based observations have only limited spatial representativeness due to microclimatic effects



COMPLETED WSR-88D INSTALLATIONS



OPERATIONAL SUPPORT FACILITY
NORMAN, OKLAHOMA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200
300
400
500
600
700
800
900
15550 m
13050 m
11260 m
9880 m
8730 m
6830 m
5280 m
2817 m
1352 m
726 m
450 m
-40
-30
-20
-10
0
10
20
30
40
00Z 22 Nov 2013
University of Wyoming
SLAT 64.81
SLON -147.86
SELV 138.0
SHOW 23.80
LIFT 33.06
LFTV 33.07
SWET 105.0
KINX -61.1
CTOT 1.00
VTOT 11.00
TOTL 12.00
CAPE 0.00
CAPV 0.00
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CINV 0.00
EQLV -9999
EQTV -9999
LFCT -9999
LFCV -9999
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BRCV 0.00
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LCLP 889.5
MLTH 253.5
MLMR 0.44
THCK 5130.
PWAT 0.97

Importance of Satellite Products to National Weather Service, Alaska

- Satellites have unique advantages
  - Spatially comprehensive
  - Monitor data-poor areas upstream of Alaska: North Pacific, Russian Far East, Arctic Ocean
- Polar Orbiters
  - Many passes per day thanks to Alaska's latitude
  - No parallax or degradation of spatial resolution: GOES
- SNPP/VIIRS
  - Broadened swath width, sharpened spatial resolution
  - New products, for example Day Night Band

Producing and delivering VIIRS products to the NWS in Alaska

- UAF/GINA receives data via direct broadcast
- U of Wisconsin CSPP software used to produce AWIPS-ready VIIRS products
- Products delivered to WFO Fairbanks via LDM using UAF comms
- Products then delivered to NWS Alaska Region HQ and distributed to WFOs Anchorage and Juneau

Producing and delivering VIIRS products to the NWS in Alaska

- Ideal goal: receipt of data, production of imagery, and delivery of products all contained within Alaska
- **Result: latency is minimized**
- Taking advantage of multi-core processing in U of Wisconsin's CSPP code
- Hosting NASA/SPoRT VMs at GINA…but need faster machines at GINA to maximize benefit

High Latitude PG: UAF-GINA & Alaska NWS Current SNPP Data Flow

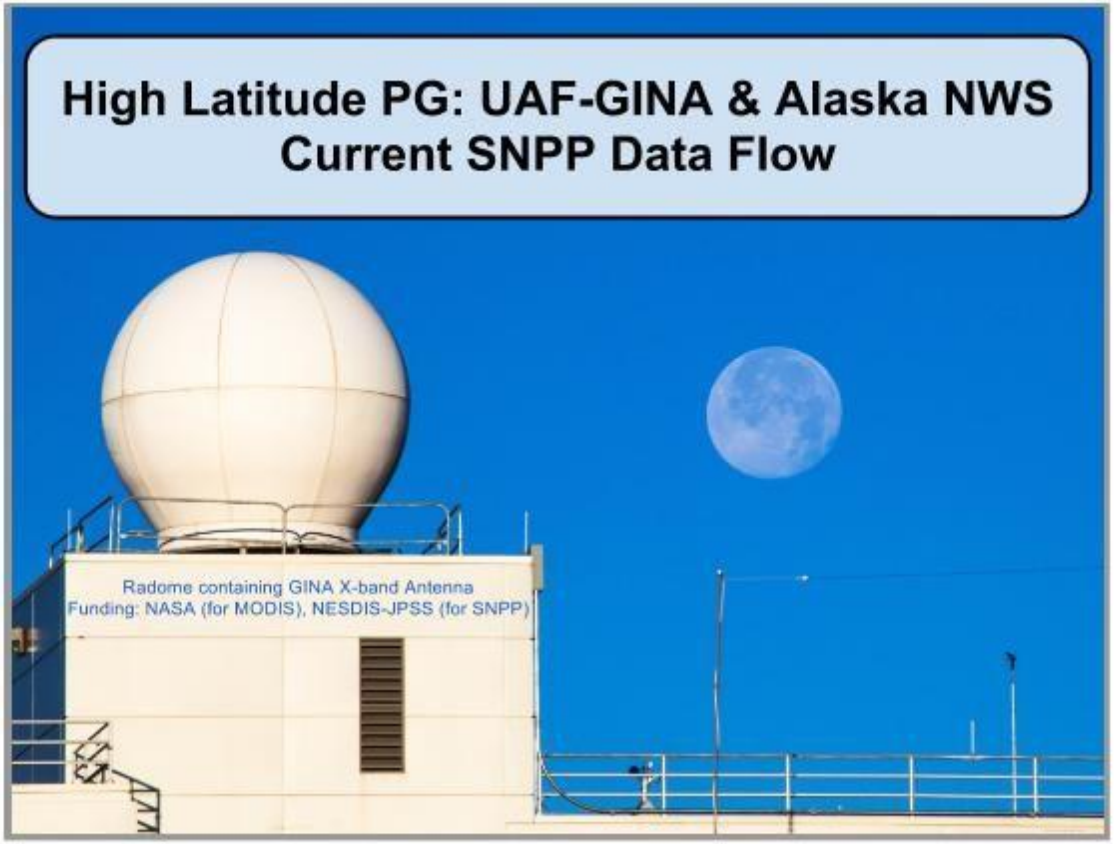
GINA X-Band Direct Readout Station (SNPP capture)

CSPP Processor

Polar2Grid

SNPP VIIRS Products

I01: 0.64µm (Visible)
I03: 1.61µm (Snow/Ice)
I04: 3.74µm (MWIR)
I05: 11.45µm (LWIR Window)
DNB: Low light visible
Fog: 11.45µm - 3.74µm



LDM (data distribution)

ldm.gina.alaska.edu

WFO Fairbanks

NWS Alaska Regional (Anchorage)

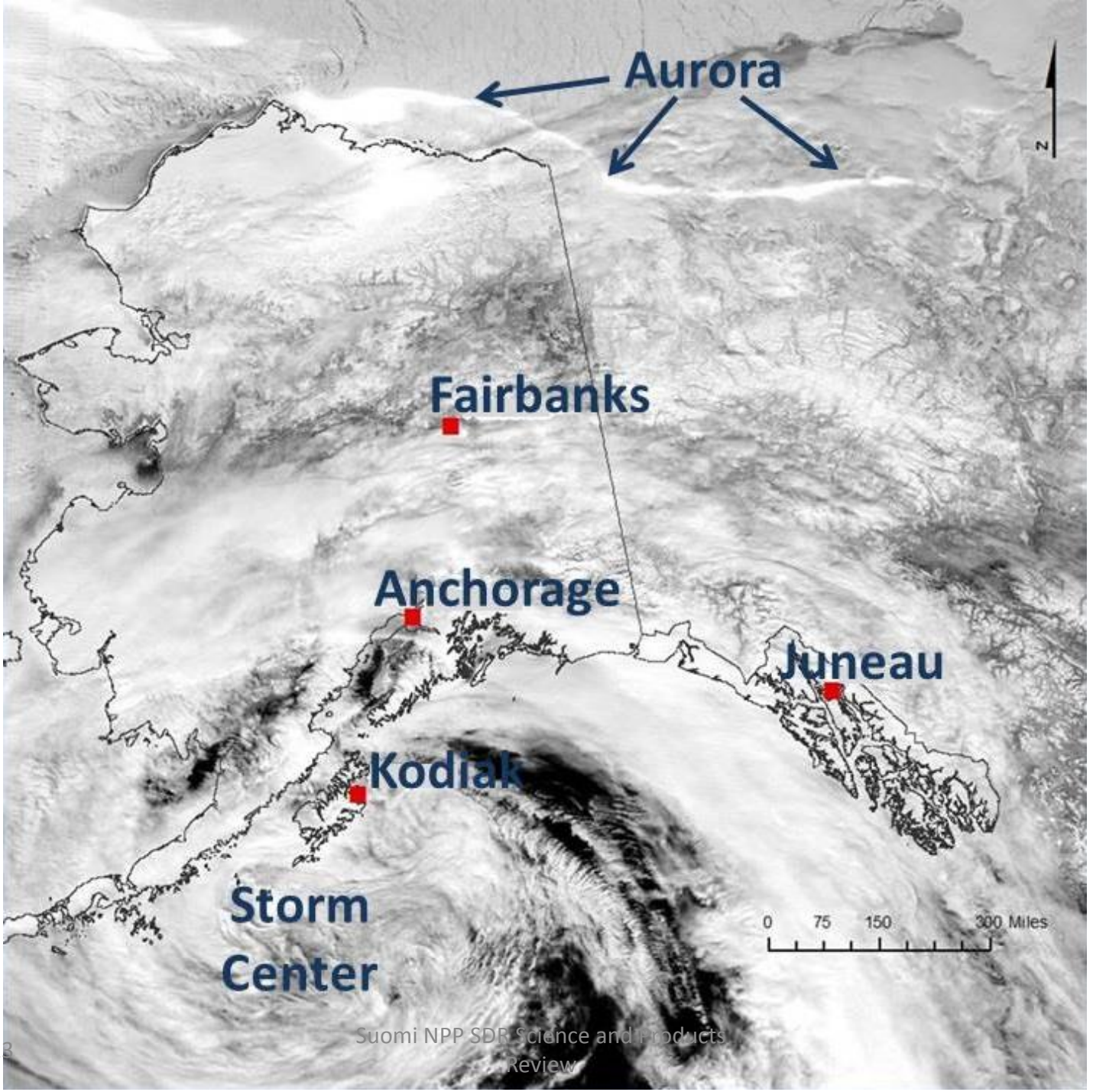
WFO Anchorage

WFO Juneau

Future Data Path. Likely via NOAA N-Wave (~15 Mbps).
NWS Fairbanks would still pull directly from GINA.

Gigabit Ethernet (1000 Mbps)
NOAA MPLS circuit (6 Mbps)
NOAA MPLS circuit (3 Mbps)

GINA www.gina.alaska.edu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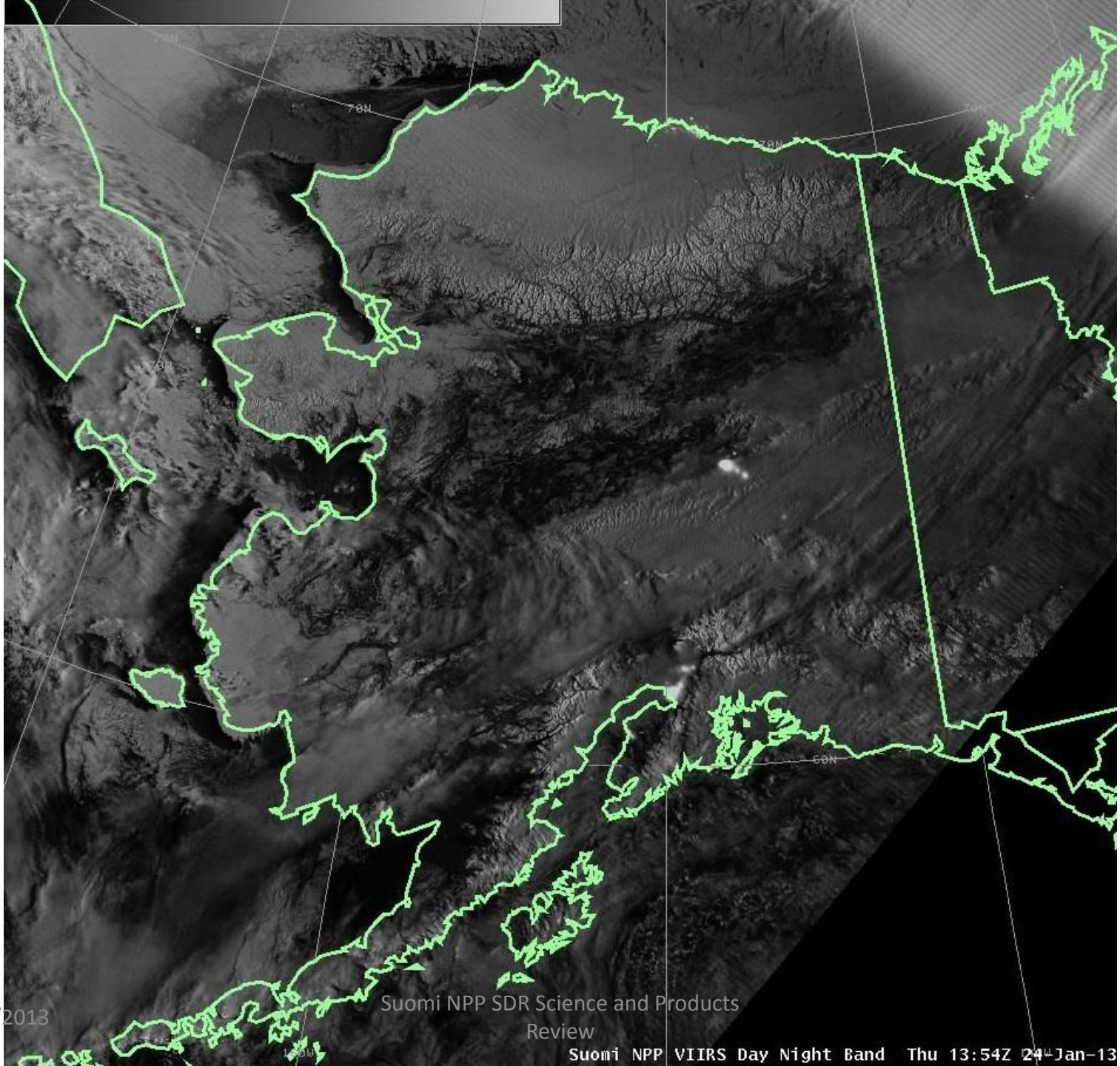
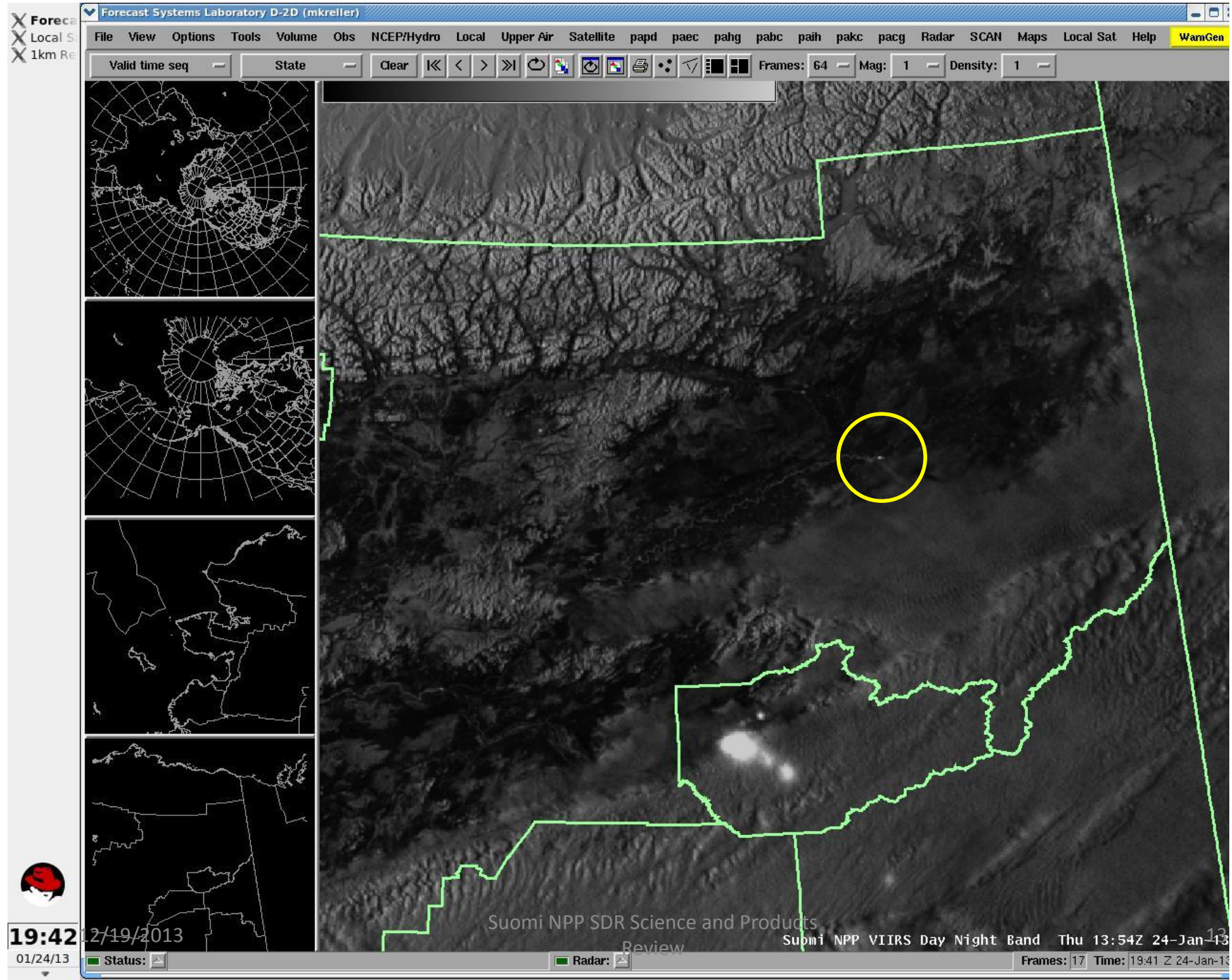
N
Fairbanks
Anchorage
Juneau
Kodiak
Storm
Center
0 75 150 300 Miles


70N
60N
Suomi NPP VIIRS Day Night Band Thu 13:54Z 24-Jan-13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File View Options Tools Volume Obs NCEP/Hydro Local Upper Air Satellite papd paec pahg pabc paih pakc pacg Radar SCAN Maps Local Sat Help WarnGen
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State
Clear
Frames: 64
Mag: 1
Density: 1
Suomi NPP VIIRS Day Night Band Thu 13:54Z 24-Jan-13
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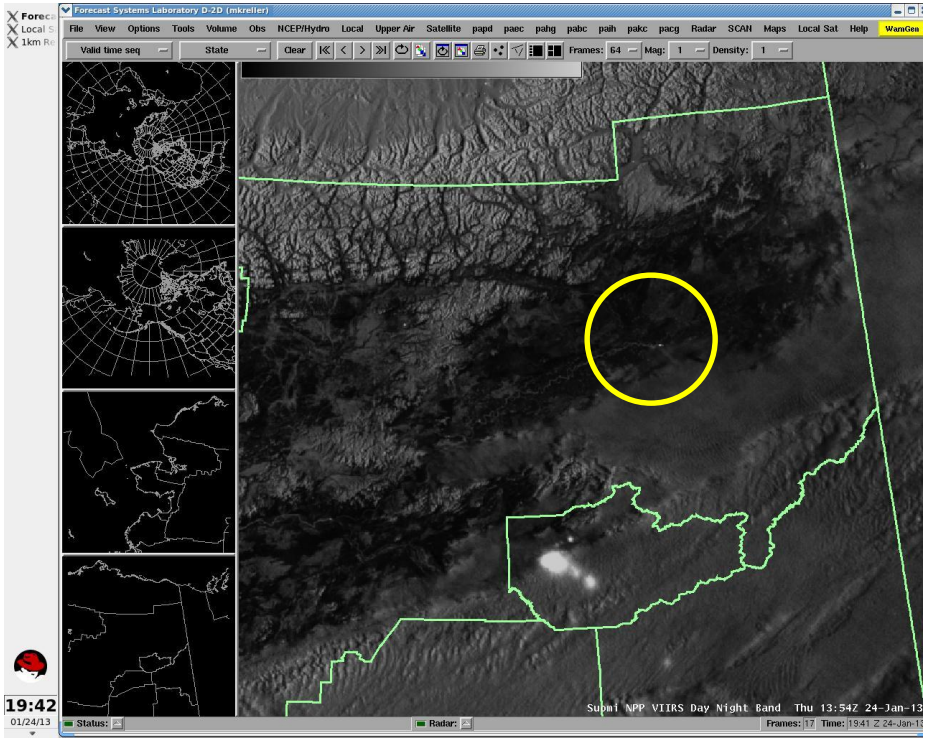
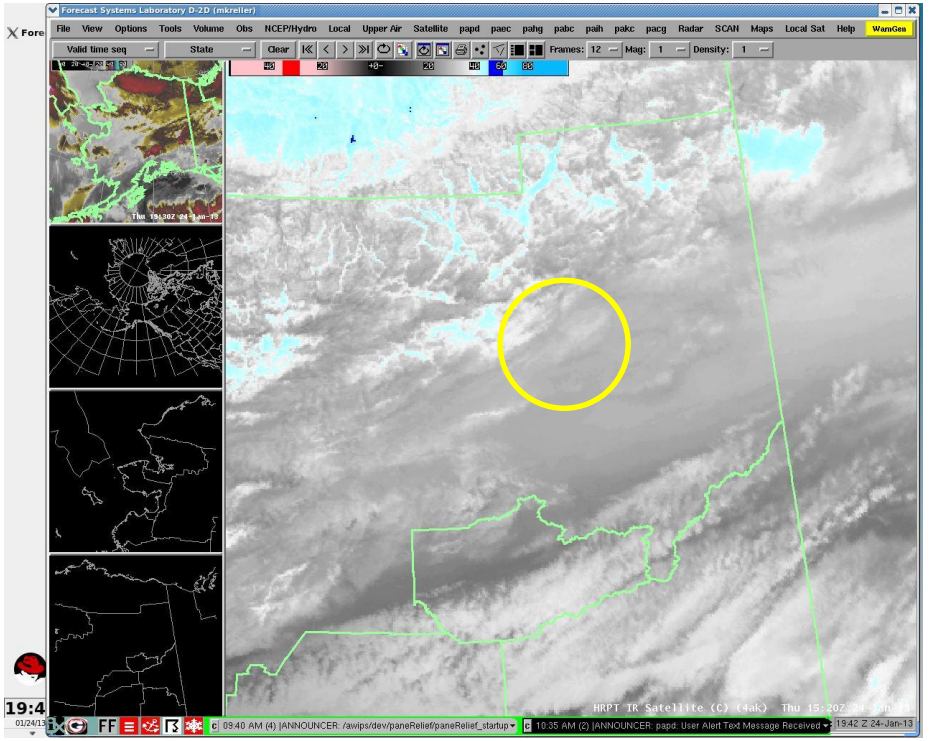
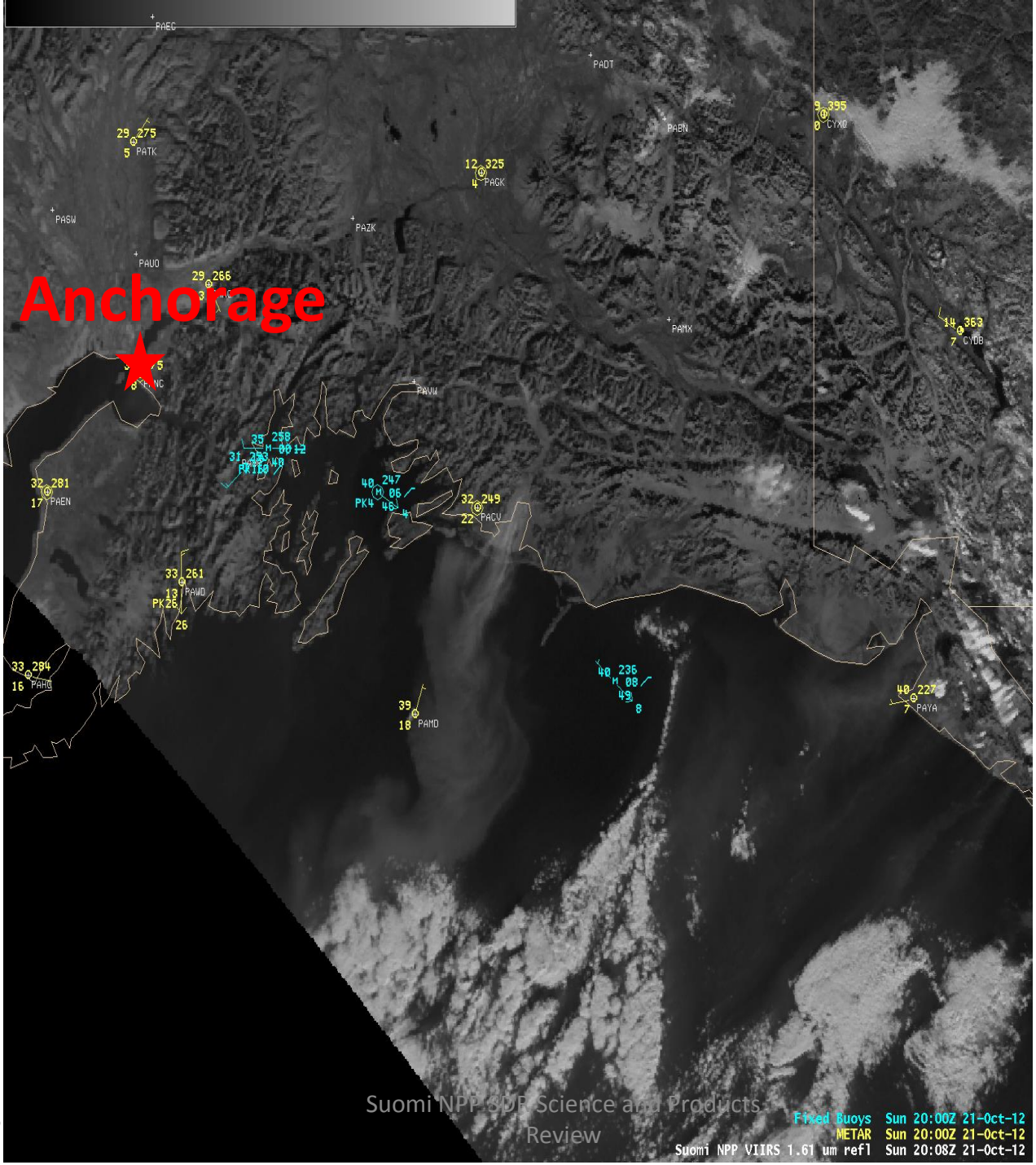
19:42
01/24/13

VIIRS Day Night and HRPT IR






Anchorage
PAEC
PADT
PABN
PATK
PAGK
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CYXQ
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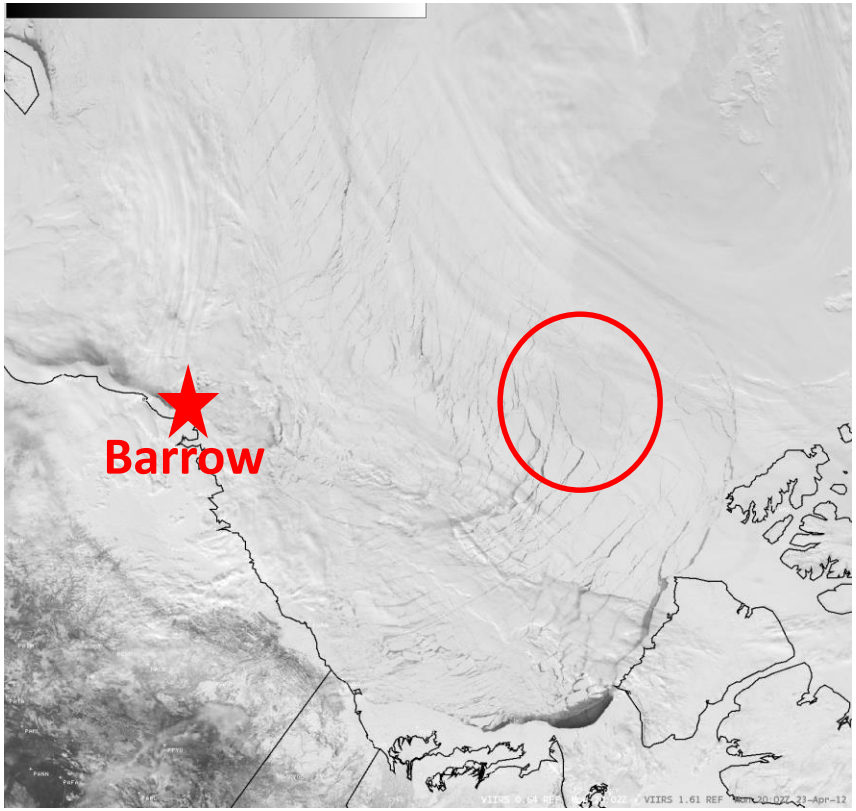
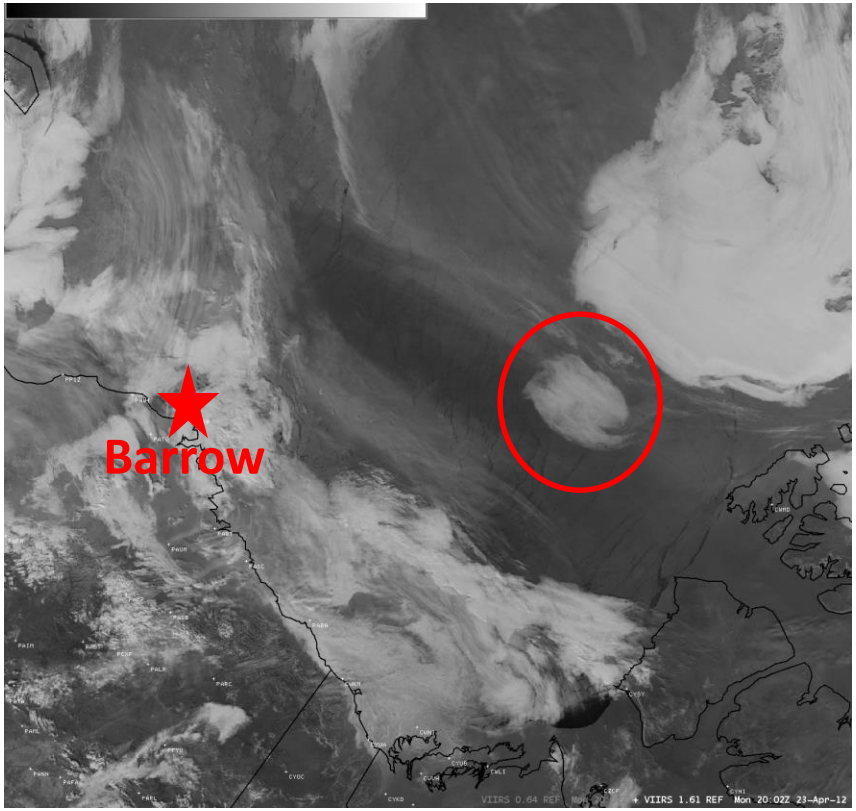
PAEN
PACV
PAWD
PAKO
PAMD
PAYA
Fixed Buoys Sun 20:00Z 21-Oct-12
METAR Sun 20:00Z 21-Oct-12
Suomi NPP VIIRS 1.61 um refl Sun 20:08Z 21-Oct-12

North Slope, April 2012

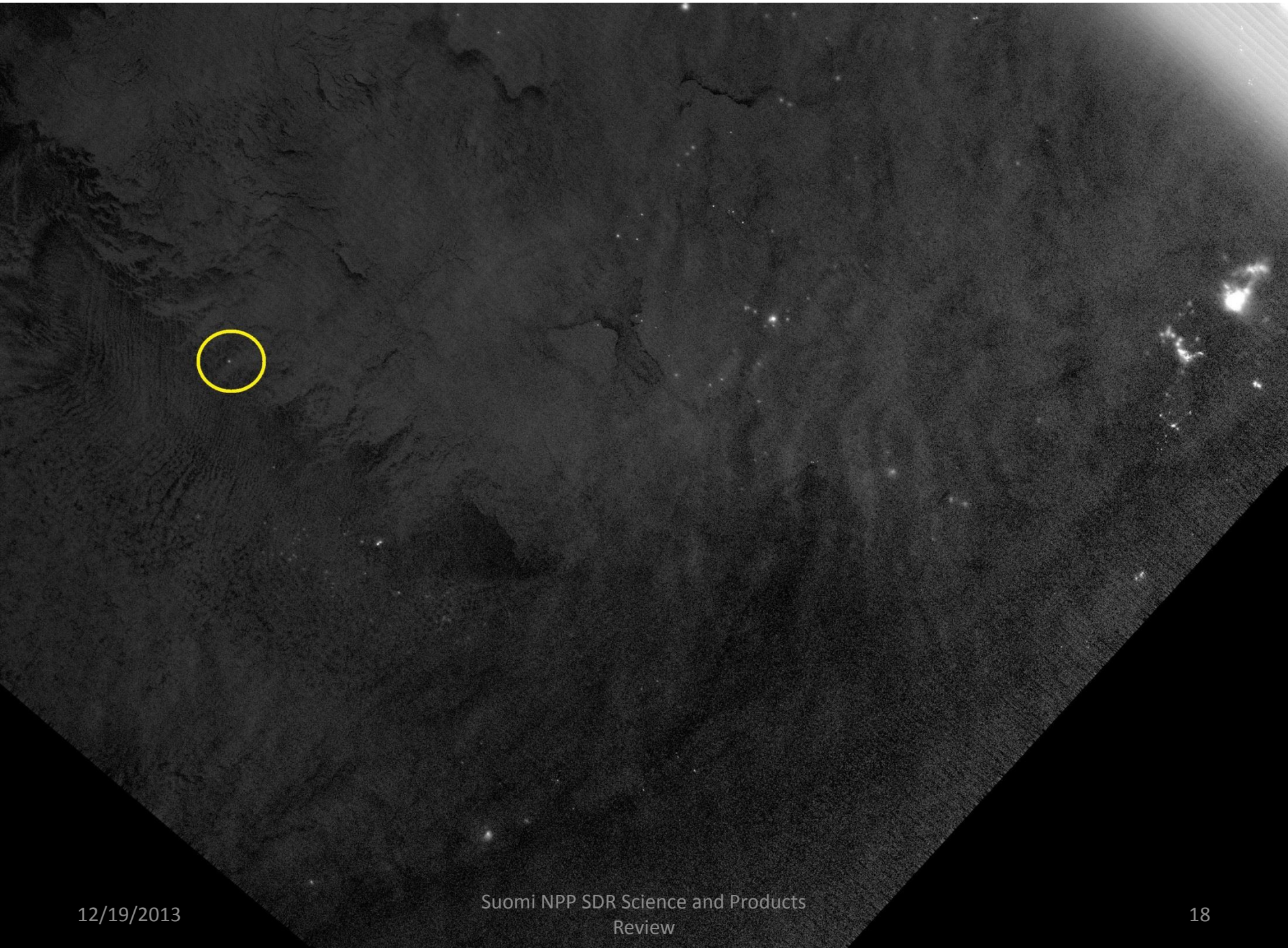


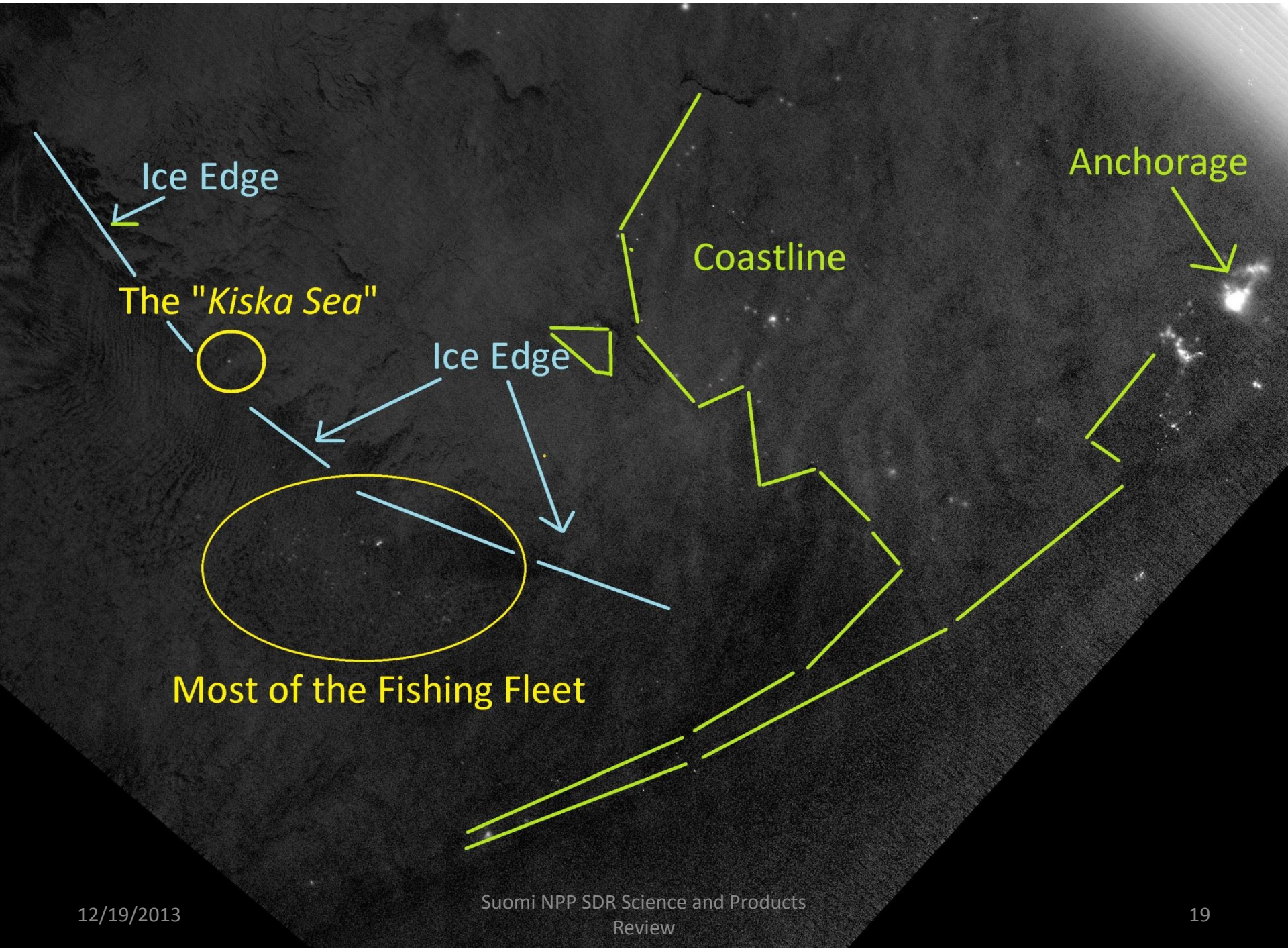
- Comparison of VIIRS 0.64µm visible and 1.61µm short-wave IR
- Visible image contains very little contrast
- 1.61µm IR image highlights liquid clouds (light) against snow-covered ground, sea ice, and glaciated clouds (dark)

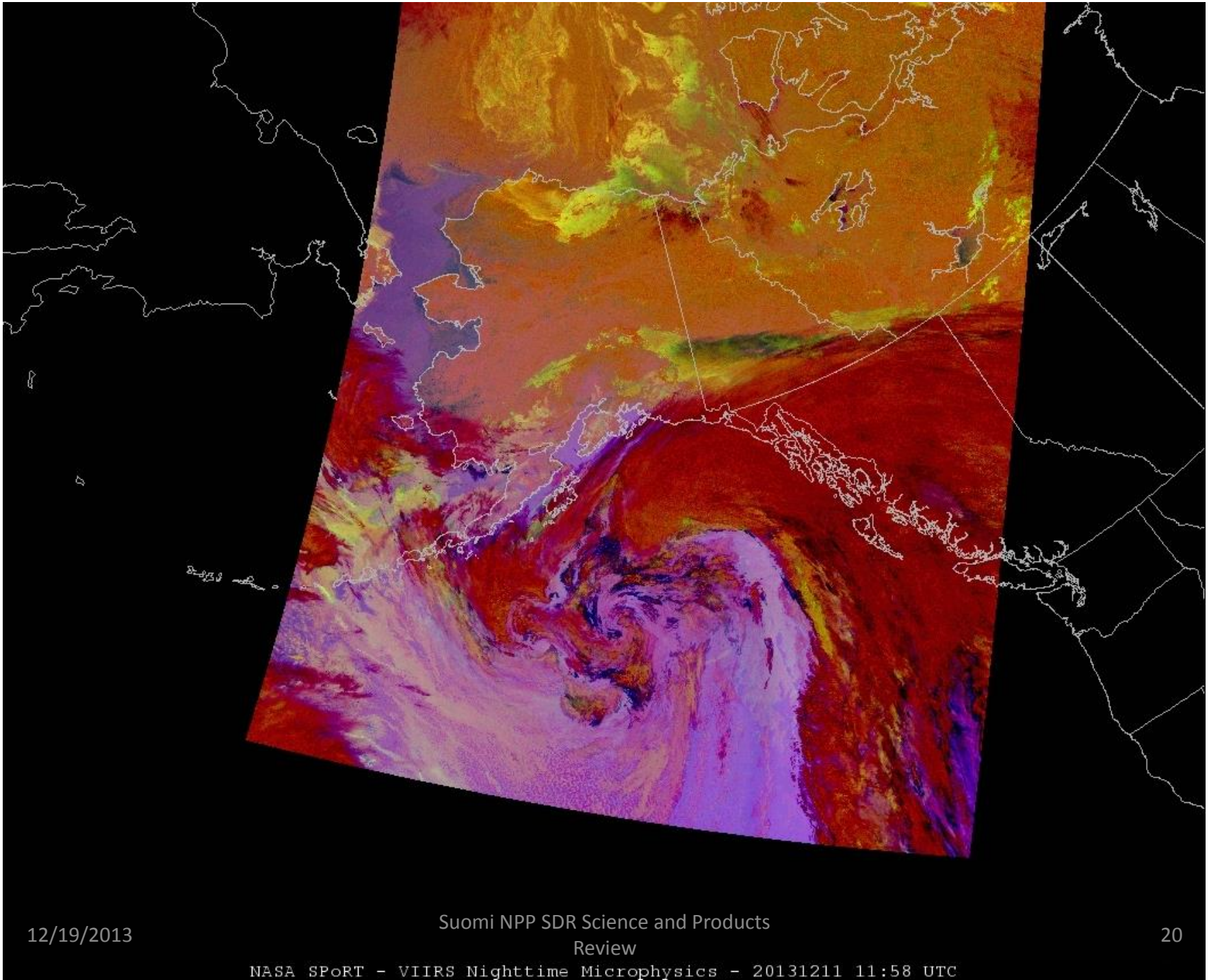
North Slope, April 2012



- Comparison of VIIRS 11.45µm long-wave IR and 1.61µm short-wave IR
- 1.61µm IR offers improved contrast over 11.45µm IR in discriminating between some cloud layers and the surface
- **No single product tells the whole story—use of multiple products is optimal**




Ice Edge
The "*Kiska Sea*"
Ice Edge
Most of the Fishing Fleet
Coastline
Anchorage


NASA SPoRT - VIIRS Nighttime Microphysics - 20131211 11:58 UTC

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